REMARKS

Status of Claims

Claims 1-19 are pending in the instant application. In the outstanding Office Action, claims 1-19 are rejected under 35 U.S.C. § 103.

In the Amendment submitted herein: claims 1, 8 and 13 are amended; and claims 20-22 are newly added as depending from claims 1, 8 and 13, respectively. Particularly, claims 1, 8 and 13 are amended to further recite that the refractory metal layer, the drain, source or first electrode region and the anode or first electrode are laminated in a thickness direction of the device. Support for the amendment to the claims 1, 8 and 13 is found in the specification, specifically page 17, line 7 through page 18, line 12, and Figures 4A and 4B. Support for the newly added claims 20-22 is found in the specification, specifically, page 14, lines 7-8, and Figures 4A and 4B. Therefore, no new matter has been introduced. Entry of the amendment is respectfully requested.

Claim Rejections – 35 U.S.C. § 103

Claims 1-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant's prior art in view of Yamauchi et al. (U.S. Patent No. 5,640,067: hereinafter referred to as Yamauchi).

Applicants recite in claim 1 an organic electroluminescence device comprising, *inter alia*, a refractory metal layer connecting a source region or drain region of a thin film transistor to an anode of an organic electroluminescence element, and the refractory metal layer, the source region or drain region, and the anode are recited as being

laminated in a thickness direction of a substrate of the device. These teachings of Applicants are not taught or suggested by the Applicants's admitted art and Yamauchi.

As recognized by the Examiner in the outstanding Office Action, Applicants' admitted art does not disclose a refractory metal layer connecting a source region or a drain region of a thin film transistor to an anode of an organic electroluminescence element.

As to the Yamauchi reference, the Examiner states that Yamauchi discloses a refractory metal layers 111 and 112 to connect a drain region 107 of a thin film transistor (TFT) to a transparent electrode 109 of an organic electroluminescence (EL) element, and further states that Yamauchi teaches using a refractory metal for preventing the diffusion of silicon atoms from the drain or source region to the drain or source electrode. Based on these, the Examiner alleges that it would have been obvious to one of ordinary skill in the art at the time the invention was made to form a refractory metal layer to connect the drain region to the anode of the EL element of Applicants' admitted art in order to prevent the migration of silicon atoms to the source or drain electrode as taught by Yamauchi.

Referring to Figures 3c and 3d and the related text portion of the Yamauchi reference, a drain electrode and conductive lead of aluminum 114 is electrically coupled to a drain region 107 of an active silicon layer 102 via the barrier metal layer of titanium nitride 111 and to the transparent electrode layer 109 via the contact metal layer of titanium nitride 112. However, the barrier metal layer 111, the drain region 107 and the drain electrode and conductive lead 114 do not form a laminated structure in a thickness direction of the device as clearly shown in Figures 1, 3c and 3d. Similarly, the barrier metal layer 112, the transparent electrode layer 109 and the drain electrode and conductive lead 114 are not laminated in a thickness direction of the device.

As apparent from the foregoing, Applicants' admitted art and Yamauchi fail to teach all the limitations as recited in claim 1.

Further, in accordance with the claimed invention, TFT and EL element are laminated in a vertical direction because of the laminated structure made by the refractory metal layer, the source or drain of TFT and the anode of EL element. Therefore, as described in the specification, specifically, at page 17, line 7 through page 8, line 12, the TFT is able to stably supply sufficient current to the organic EL element via a power source line 53 (Figure 4B). Further, the deterioration of TFT can be prevented and data signals to be displayed can be reliably captured. Yamauchi is moot with regard to such effects as obtained by Applicants' invention.

Moreover, if light emitted from EL element is discharged upward, the anode can be extended to a TFT formation region in order to discharge the light emitted from the EL element. Therefore, an aperture ratio, which is the ratio between a luminous region and a pixel region, can be increased. If light emitted from EL element is discharged downward, the anode can also be extended to the TFT formation region. As a result, the aperture ration can be improved due to the fact that light is discharged at gaps between structures such as a gate electrode and active layer forming the TFT.

In contrast, Yamauchi does not disclose a vertically laminated structure of TFT and EL element. As clearly shown in the drawings of the reference, Yamauchi's device discloses a structure in which TFT and EL element are formed on a substrate in parallel. Therefore, the region where TFT is formed may not emit light from the EL element. That is, no matter how the light emitted from EL element propagates either upward or downward, the light from EL element is not emitted at the TFT formation region. As a result, an aperture ratio would be small.

In light of the foregoing, Applicants respectfully submit that there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference teachings to make the claimed invention. Similarly, there is no reasonable expectation of success in combining the reference teachings to make the claimed invention, because the references clearly fail to teach a laminated structure formed by a refractory metal layer, source or drain of TFT and an anode of EL element.

At least the foregoing reasons, Applicants respectfully submit that there is no a prima facie obviousness with regard to claim 1.

Claims 2-7 variably depend from claim 1 which is now believed to be a non-obvious independent claim. Therefore, claims 2-7 are inherently allowable.

Meanwhile, in claim 8, Applicants recite an organic electroluminescence device comprising, *inter alia*, a contact between one of a source and drain in an active layer and an anode of an organic electroluminescence element, and between the other of the source and drain in the active layer and a power source line, and the contact is recited as being achieved through a refractory metal layer, and the refractory metal layer, one of the source and drain, and the anode are recited as being laminated in a thickness direction of the organic electroluminescence device.

As discussed above with regard to the rejection of claim 1, the references fail to teach or suggest a structure in which a refractory metal layer, source or drain, and an anode are laminated in a thickness direction of a device.

Accordingly, for at least the same reasons applied to claim 1, claim 8 is not anticipated nor rendered obvious by the references relied upon by the Examiner.

Claims 9-12 are recited as being dependent upon claim 8. Therefore, claims 9-12 are now believed to be allowable as depending from what is now believed to be an allowable independent claim, claim 8.

Similarly, in claim 13, a refractory metal layer, a first electrode region of TFT and a first electrode of EL element are recited as being laminated in a thickness direction of a device.

Accordingly, claim 13 is not anticipated nor rendered obvious by the references cited by the Examiner for at least the same reasons applied to claim 1. Therefore, claims 14-19 are believed to be allowable as variably depending from claim 13 which is now believed to be allowable.

For at least the foregoing reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-19 under 35 U.S.C. § 103(a).

Newly Added Claims

Claims 20-22 are newly added. Specifically, claim 20 depends from claim 1, and is recited as further comprising a planarizing film on which the anode is formed. Similarly, claims 21 and 22 are newly added as depending from claims 8 and 13, respectively, corresponding to claim 20. These claims 20-22 are supported by the originally filed specification and the drawings as stated in the section of "Status of Claims".

Therefore, claims 20-22 are inherently allowable as depending from allowable independent claims 1, 8, and 13, respectively. Consideration and allowance of the claims 20-22 is respectfully requested.

Conclusion

As discussed above, the references relied upon by the Examiner fail to anticipate or render obvious claims 1-19 because all the limitations of the claimed invention are not taught or suggested by the references. Further, newly added claims 20-22 are not anticipated nor rendered obvious by the references. Accordingly, it is respectfully requested that claims 1-22 be passed to issue.

It is believed that the foregoing amendment and remarks fully comply with the Office Action, and that the claims, as amended herein, are now allowable to Applicants. Thus, reconsideration and allowance are respectfully requested.

The Examiner is invited to contact Applicant's Attorneys at the below-listed telephone number with any questions, comments, or concerns, regarding this Response or otherwise.

If there are any additional charges with respect to this Response or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,
SUZUKI KOJI, ET AL

CANTOR COLBURN LLP
Applicants' Attorneys

By: _____
Daniel F. Drexler
Registration No. 47,535
Customer No. 23413

Date: 16 Nov. 2001
Tel: 860-286-2929

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Claims 1, 8 and 13 are amended herein as follows.

1. (Amended/Marked up) An organic electroluminescence device comprising:

an organic electroluminescence element and a thin film transistor which are formed on a substrate; said organic electroluminescence element having at least an organic emissive layer disposed between an anode and a cathode; said thin film transistor controlling a current flowing to said organic electroluminescence element; said thin film transistor having an active layer made of a semiconductor material; and

a refractory metal layer connecting a source region or drain region of said thin film transistor to said anode of said organic electroluminescence element, said refractory metal layer, one of said source region and drain region, and said anode being laminated in a thickness direction of said substrate.

8. (Amended/Marked up) An organic electroluminescence device comprising:

pixels, each of said pixels including an organic electroluminescence element and a thin film transistor, said organic electroluminescence element having an emissive layer disposed between an anode and a cathode, said thin film transistor controlling a current flowing from a power source line to said organic electroluminescence element, said thin film transistor having an active layer made of a semiconductor material; and

a contact between one of a source and drain in said active layer and said anode of said organic electroluminescence element, and between the other of said source and drain in said active layer and said power source line, [is respectively] said contact being achieved through a refractory metal layer, said refractory metal layer, one of said source and drain, and said anode being laminated in a thickness direction of said organic electroluminescence device.

13. (Amended/Marked up) A light emitting device comprising:

an emissive element having an emissive layer between a first electrode and a second electrode;

a thin film transistor for controlling power supplied to said emissive element, said thin film transistor having an active layer made of a semiconductor material; and

a refractory metal layer connecting a first electrode region in said active layer to said first electrode of said emissive element, said refractory metal layer, said first electrode region and said first electrode being laminated in a thickness direction of said light emitting device.